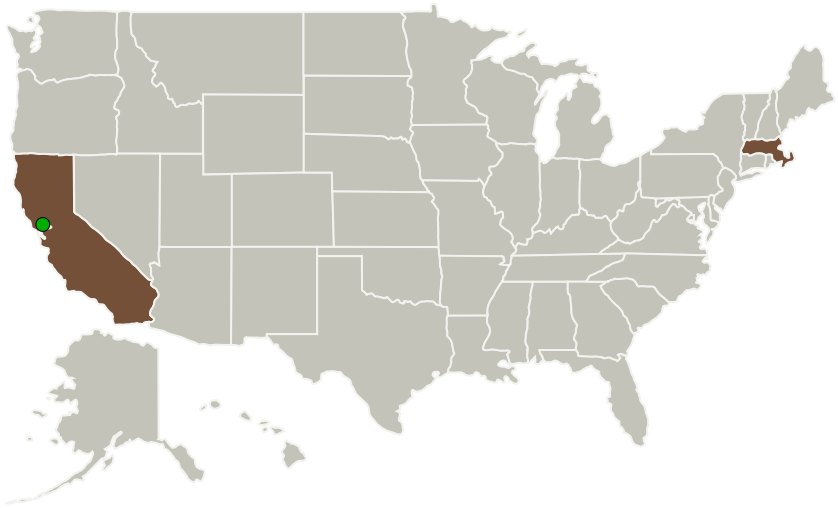
Artificial Intelligence for Refining Multi-Aircraft Testbed Environments, Phase I

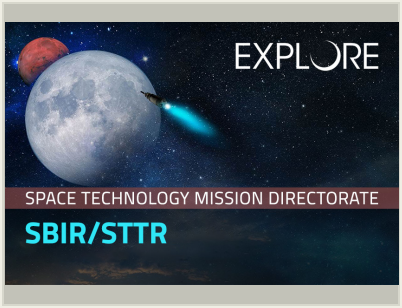
Completed Technology Project (2011 - 2011)

Project Introduction

NASA is researching various concepts, procedures, standards, and technologies intended for NextGen Airspace. Complex, distributed airspace simulations that utilize experimental testbeds (e.g., Multi Aircraft Control System, or MACS) are vital research tools for these projects. However, managing the various complexities and coordination of agent-supported separation assurance can be challenging. This often creates undesired staffing and training requirements, workload, and susceptibility to human error that can disrupt planned scenario events. To address this issue, we propose to develop Artificial Intelligence for Refining Multi-Aircraft Testbed Environments (AIR-MATE). This proposed innovation will provide a MACS-interoperable software module that coordinates the behaviors of human-automation pairs in simulated NextGen airspace. This effort will leverage recent advancements in distributed constraints optimization and adjustable autonomy to analyze airspace simulations in a decentralized, parallel manner and solve problems locally for enhanced efficiency. This technology will reduce the workload and staffing requirements in current NextGen simulations, while ensuring the desired scenario events and separation assurance is properly executed. The results of the AIR-MATE effort will be a more controlled and high-fidelity testbed environment that will aid researchers, increase the quality of NextGen research, and ultimately benefit the development of NextGen concepts.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Aptima, Inc.	Lead Organization	Industry	Woburn, Massachusetts
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Massachusetts

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138008)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Aptima, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

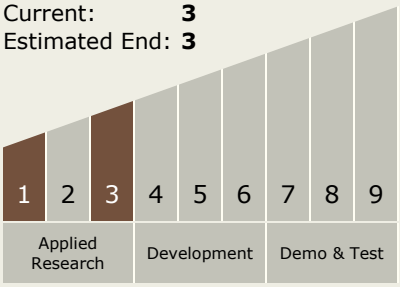
Carlos Torrez

Principal Investigator:

Nathan Schurr

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.4 Architectures and Infrastructure

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System